High posterior take-off origin right coronary artery in coronary angiography: A case report

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ABSTRACT

A 75-year-old woman previously healthy female nonsmoker was admitted with a chief complain of burning chest pain (unstable angina) and dyspnea on exercise. Because of unstable angina, Coronary angiography was done immediately and revealed RCA arose about 3.7 centimeters above sinotubular junction and originated from the posterior surface of the ascending aorta. She was undertreated by prophylactic treatment. PCI was not performed because the patient was not satisfied and discharged with shortness of breath and chest pain. "High take-off" alludes to an unusual high origin coronary artery from junctional zone; between its sinus and the tubular part. The main subject is decreased coronary perfusion and Angiography-based imaging for scrutinized evaluation of anomalous vessels is important. Cardiologists and treatment staff should be updated, because it can have significant impact on the patient’s prognosis and clinical outcome of patient. Prophylactic drug therapy may prevent the potential complications of this anomaly in the future.

Keywords: Anomalous origins, high take-off origin, right coronary artery, ascending aorta, angiography
1. INTRODUCTION
Unusual origin of the right coronary artery (RCA) is an uncommon abnormality and angiography, echocardiography, autopsy and CT-scan are common processes that can detect this anomaly. The general pervasiveness of an atypical RCA is about 0.2% in the angiography based studies, and about 0.15% pervasiveness of RCA originating from the ascending aorta atypically (Ho & Strickman, 2002; Yamanaka & Hobbs, 1990). High take-off RCA is one of extremely rare anomalous origin. High take-off coronary arteries alludes to the origin of coronary arteries more than 1 cm over the sinotubular junction (Loukas et al., 2016). Here, we report a special case with this anomaly who presented with chest pain, dyspnea and normal electrocardiogram (ECG) at ER and then underwent Coronary angiography (CAG). Finally, we find high posterior take-off origin for RCA.

2. CASE REPORT
A 75-year-old woman previously healthy female nonsmoker was admitted in our hospital with a chief complaint of burning chest pain (unstable angina) and dyspnea on exercise that occurs recently in winter. The patient said when she has dyspnea, cough and non-bloody sputum added and this situation exacerbated with cold. In past surgical history, there was Hysterectomy on 20 years ago. Except spontaneous tension headache, there were no remarkable points in past medical history of our patient especially IHD, DM, HLP, and other cardiovascular disease. Upon physical examination, the patient showed no cardiac murmur, abnormal breath sounds, hypotension, tachypnea, jugular vein engorgement, desaturation, or peripheral edema. At emergency room, an electrocardiogram was taken and it was normal. We decided to medical treatment and administered Tab ASA 80 mg Daily, Tab Atorvastatin 40 Daily, Tab Nitrocontin 2.6 BID and Tab Losartan 25 mg BID. Because of unstable angina, Coronary angiography (CAG) was done immediately. Left main coronary angiography (LMCA) CAG’s results demonstrated the origin of LMCA is from the normal site (Figure 1), Ascending aorta angiography showed normal site of LMCA origin and abnormal site for RCA, too (Figure 2). But posterior view in CAG showed unusually posterior and high origin of RCA from the ascending aorta (Figure 3). Finally, we found the distance between left and right coronary arteries origins is more than 4.5 cm (Figure 4). Finally, we diagnosed PCI must be done for further confirmation and examination, but the patient was not satisfied and discharged with shortness of breath and chest pain. There was no problem for the patient and she was not hospitalized again (coronary angiography always are available for observation on:https://we.tl/t-qzh9yKthwV).

Figure 1 LMCA coronary angiography showed the origin of LMCA is from the normal site; Figure 2 Ascending aorta angiography showed normal site of LMCA origin and abnormal site for RCA.
3. DISCUSSION

“High take-off” alludes to an uncommon high origin of either the LAD or the RCA arteries from the ascending aorta at a point up of junctional zone; between its sinus and the tubular part (Kim et al., 2006). The main subject with a “high take-off” of the RCA in a patient is decreased coronary perfusion leading to symptoms of myocardial ischemia, syncope, sudden death, or usually more pronounced on exertion. It is a considerable concern (Loukas et al., 2016; Alpaslan & Onrat, 2002; Motamedi et al., 2009) and its
prevalence in general population has estimated to be 0.20% (Loukas et al., 2016). So, peculiarities of the origin of RCA are extremely uncommon. For RCA, being originated from the left sinus of Valsalva was more usual among all the abnormalities of RCA origins was more usual in one investigation 6-27% (Yamanaka & Hobbs, 1990). Another study estimated that the RCA originating from the CX or LAD is about 12.5% (Yuksel et al., 2013). However as we said there are only rare cases were reported and found the RCA originates from ascending aorta above the sinotubular junction plane (Motamedi et al., 2009; Abdulbaki & Shah, 2015; Sarkar et al., 2009). The most emphasized anomaly situation of the RCA in documentations is take-off from the wrong coronary sinus. Bicuspid aortic valve may accompany the malformation congenitally, too. Most patients have a normal ECG, so noninvasive tests such as treadmill stress test are needed to assess myocardial ischemia (Ghaemian & Jalalian, 2009). Coronary angiography can identify the anomalous origin of the coronary artery, but the exact course of the anomalous artery and the relationship to the right ventricular outflow tract can be difficult to determine (Rogers et al., 2004). But multi-detector computed tomography (MDCT) adapts better with economical situations especially for patients and it reduces the cost and morbidity risk in them. Also MDCT decreases overall radiation exposure in comparison to quantitative (Tarhan et al., 2007; Zeina et al., 2009). Magnetic resonance imaging (MRI) may be functional that can localize the origin and pathway of the coronary arteries.

In reviewing the literature, we found a specific case that about RCA anomaly, But the RCA was not located in its usual location (Tarhan et al., 2007). The artery’s root starts from internal and arises from aorta in lower point like a tunnel portion with high take-off. The right coronary artery ostium was located approximately 5 cm above the right sinus of Valsalva during operation on transverse aortotomy for aortic valve replacement accidentally. It was indicating a complete transmural course. The right coronary artery was repaired by bypassing it with a saphenous vein graft. At postoperative month 18 the patient remains symptom free. So, in that anomaly Surgery indicates and must be performed to prevent blocking or ischemia and other side effects in future. After the diagnosis of the anomalous in coronary arteries due to unavoidable transection of its tunnel portion that gets out from top of sinotubular junction, we can repair this anomaly by direct coronary reimplantation, unroofing, or saphenous bypass, too. In our case, RCA arose about 3.7 centimeters above sinotubular junction and originated from the posterior surface of the ascending aorta and it is beyond the range of “high take off” spread.

4. CONCLUSION
Angiographic imaging for scrutinized recognition of anomalous vessels is important because of their clinical significance, cardiovascular abnormal symptoms and importance in patients who undergoing cardiac surgery. Absence of the RCA in a coronary angiogram may reveal the possibility of a more considerable coronary anomaly, so it requires more diagnostic modalities for better decision. But despite this talk, we protected the patient from myocardial ischemia, syncope or sudden death potentially with a prophylactic medication.

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Ethical code
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Conflicts of Interest:
The authors declare no conflict of interest.

Consent
Patient consent was taken prior to writing case report.

List of Abbreviations
RCA: Right Coronary Artery, PCI: Percutaneous Coronary Intervention, CT scan: Computerized Tomography Scan, ER: Emergency Room, IHD: Ischemic Heart Disease, DM: Diabetes Mellitus, HLP: Hyperlipoproteinemia, CX: Circumflex, LAD: Left Anterior Descending
REFERENCE